Exhibit 4

US 20120026366A1

(19) **United States**

(12) **Patent Application Publication**

Golan et al.

(10) **Pub. No.: US 2012/0026366 A1**

(43) **Pub. Date: Feb. 2, 2012**

(54) **CONTINUOUS ELECTRONIC ZOOM FOR AN IMAGING SYSTEM WITH MULTIPLE IMAGING DEVICES HAVING DIFFERENT FIXED FOV**

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(21) Appl. No.: **13/262,842**

(22) PCT Filed: **Apr. 6, 2010**

(86) PCT No.: **PCT/IL10/00281**

§ 371 (c)(1),
(2), (4) Date: **Oct. 4, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/167,226, filed on Apr. 7, 2009.

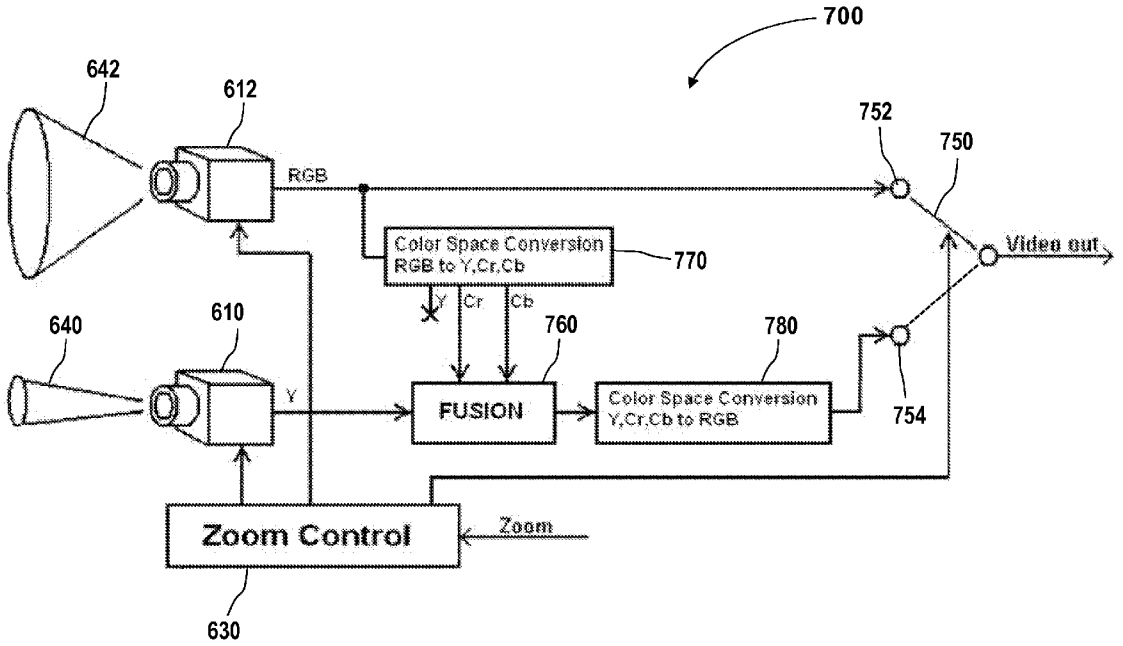
Publication Classification

(51) **Int. Cl.**
H04N 5/262 (2006.01)

(52) **U.S. Cl.** **348/240.2**; 348/E05.055

(57) **ABSTRACT**

A method for continuous electronic zoom in a computerized image acquisition system, the system having a wide image acquisition device and a tele image acquisition device having a tele image sensor array coupled with a tele lens having a narrow FOV, and a tele electronic zoom. The method includes providing a user of the image acquisition device with a zoom selecting control, thereby obtaining a requested zoom, selecting one of the image acquisition devices based on the requested zoom and acquiring an image frame, thereby obtaining an acquired image frame, and performing digitally zoom on the acquired image frame, thereby obtaining an acquired image frame with the requested zoom. The alignment between the wide image sensor array and the tele image sensor array is computed, to facilitate continuous electronic zoom with uninterrupted imaging, when switching back and forth between the wide image sensor array and the tele image sensor array.



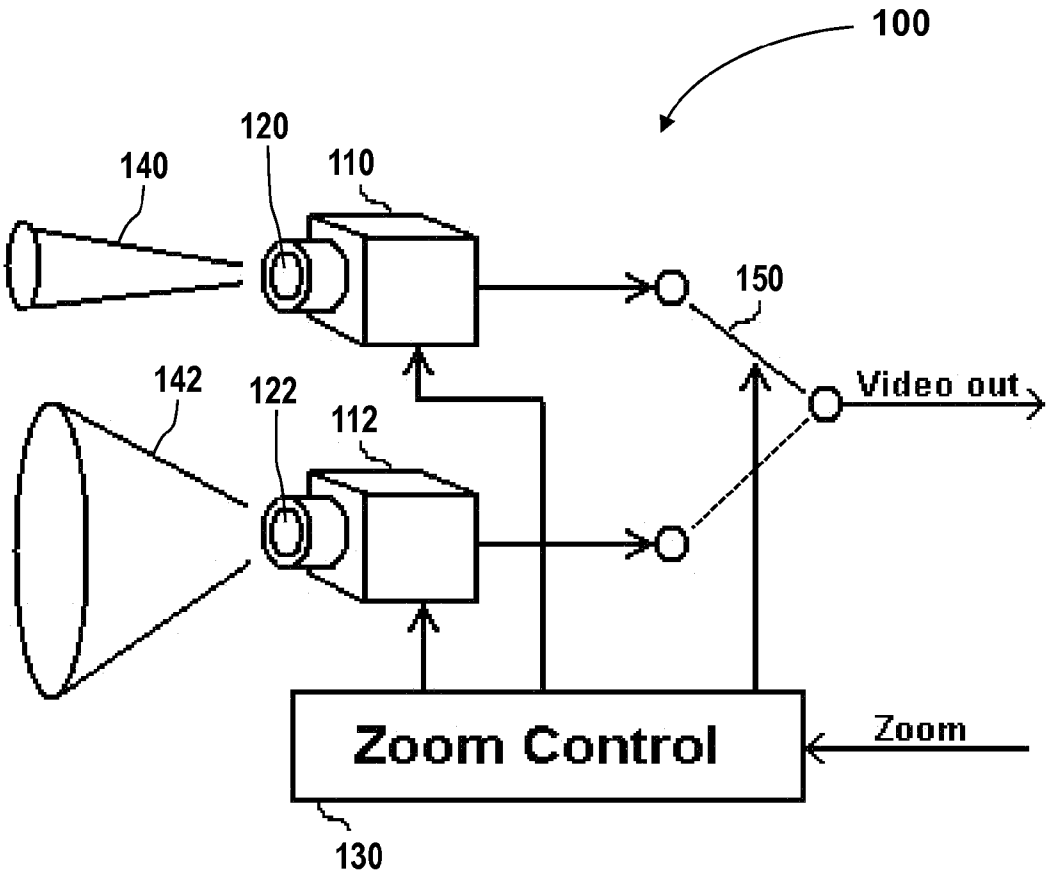

100
120
140
110
150
142
122
112
Video out
Zoom Control
Zoom
130

Fig 1

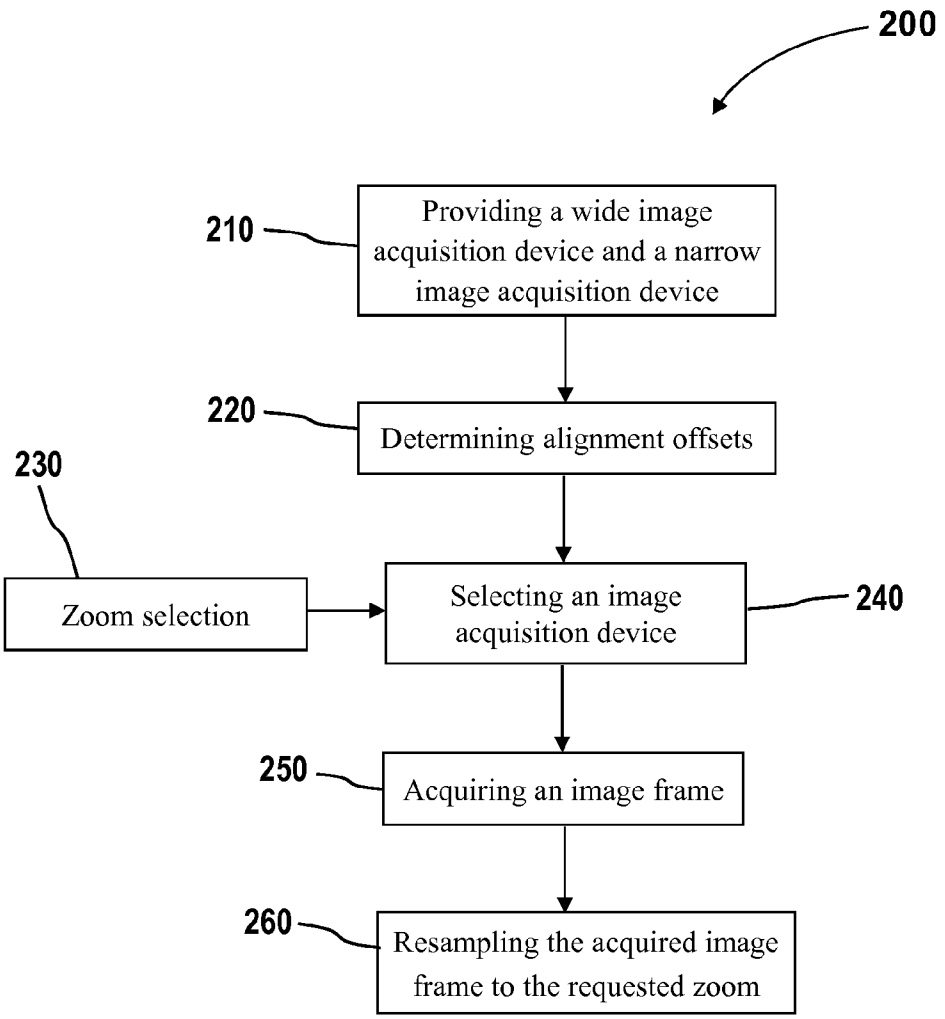

200
210
Providing a wide image acquisition device and a narrow image acquisition device
220
Determining alignment offsets
230
Zoom selection
Selecting an image acquisition device
240
250
Acquiring an image frame
260
Resampling the acquired image frame to the requested zoom

Fig 2

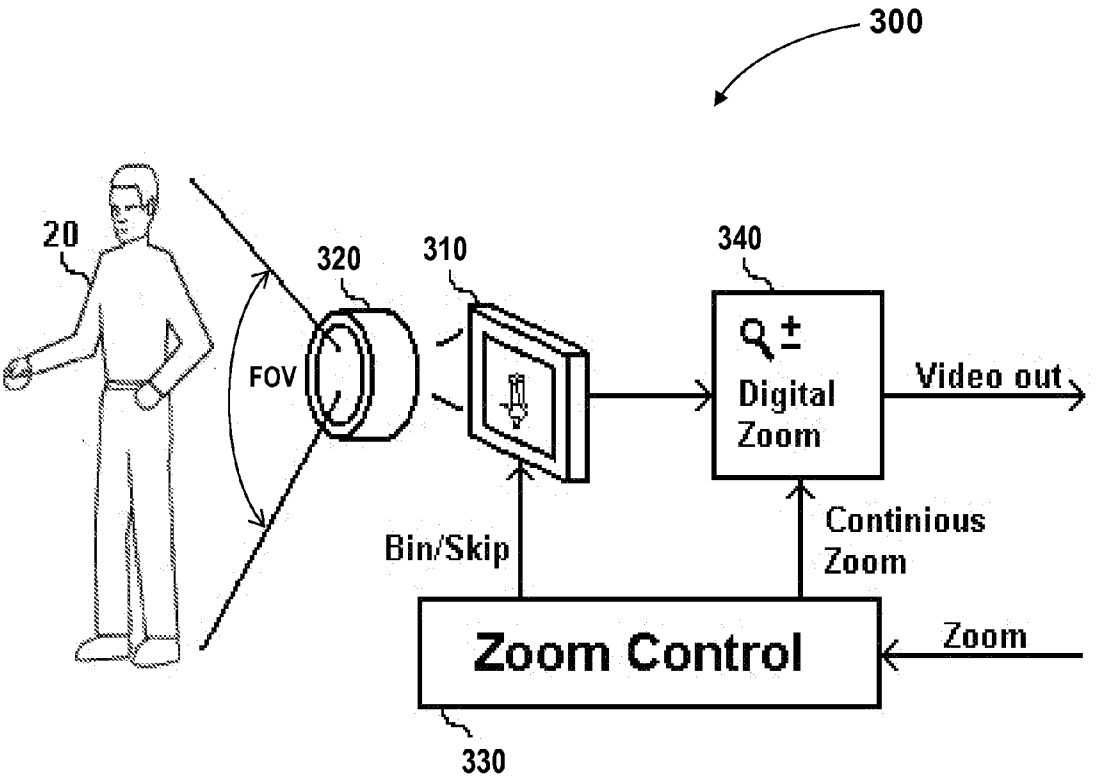

300
20
320
310
340
FOV
Digital Zoom
Video out
Bin/Skip
Continious Zoom
Zoom Control
Zoom
330

Fig 3

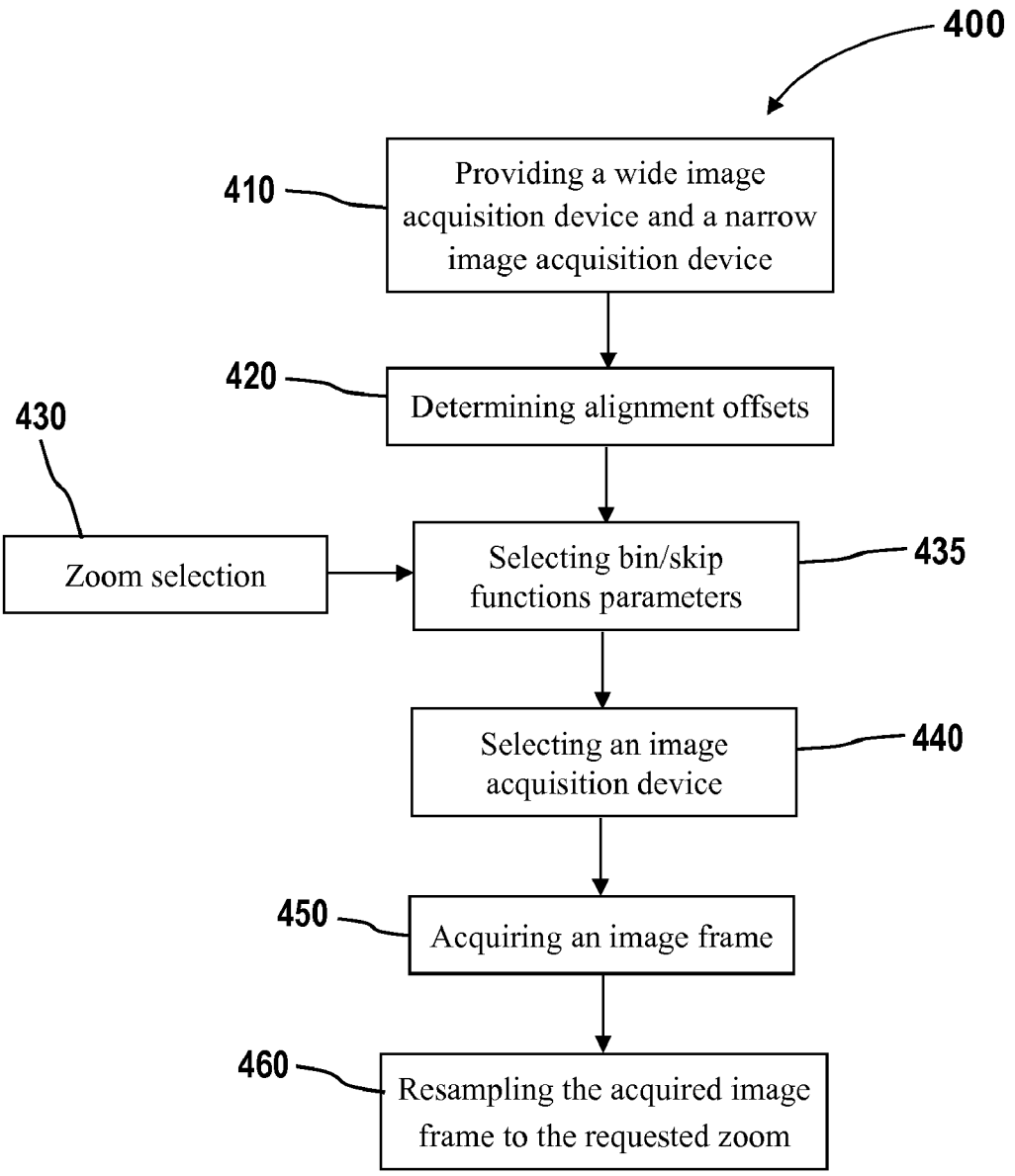

400
410
Providing a wide image acquisition device and a narrow image acquisition device
420
Determining alignment offsets
430
Zoom selection
Selecting bin/skip functions parameters
435
Selecting an image acquisition device
440
450
Acquiring an image frame
460
Resampling the acquired image frame to the requested zoom

Fig 4

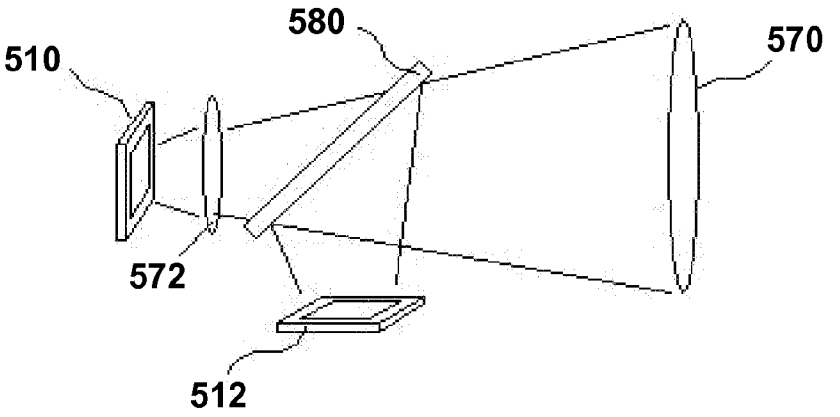


Fig 5a

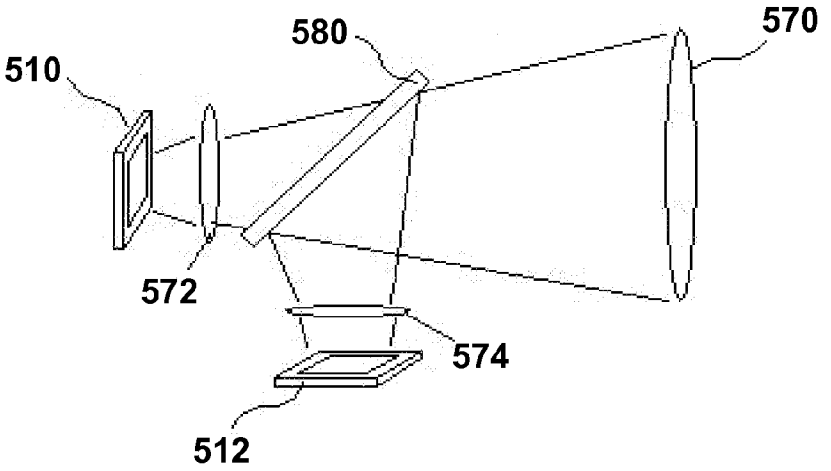


Fig 5b

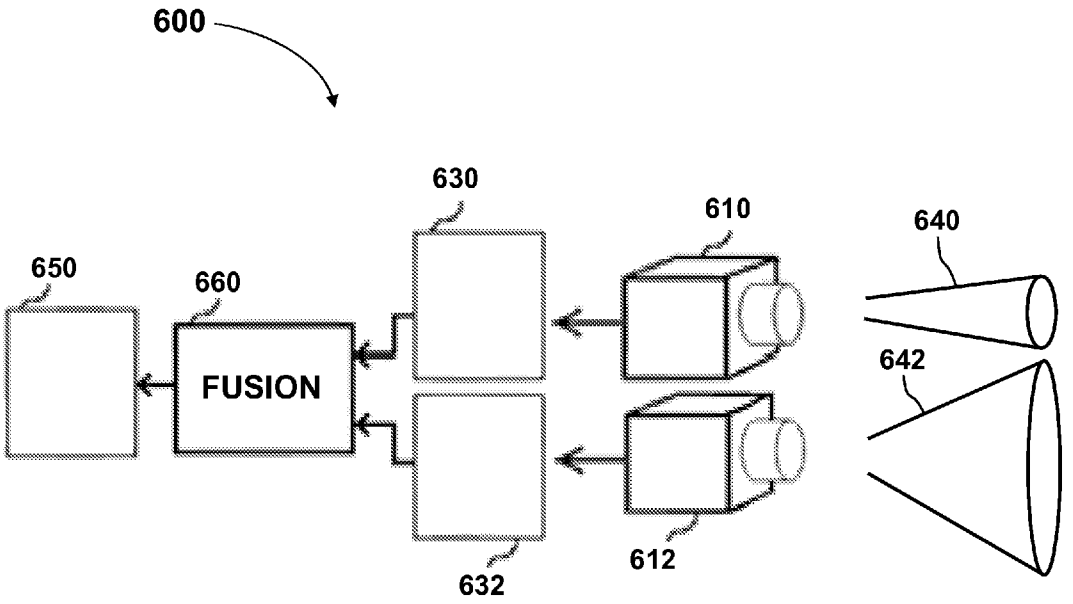


Fig 6

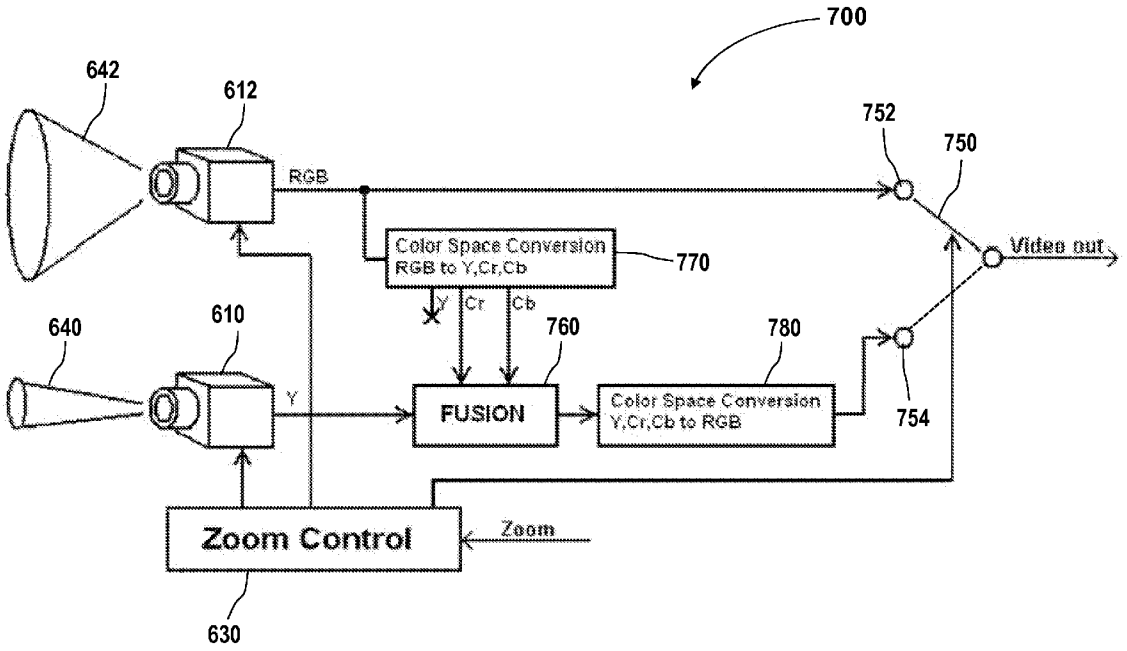

700
642
612
752
750
RGB
Color Space Conversion
RGB to Y,Cr,Cb
770
Video out
Y
Cr
Cb
640
610
760
780
Y
FUSION
Color Space Conversion
Y,Cr,Cb to RGB
754
Zoom Control
Zoom
630

Fig 7

CONTINUOUS ELECTRONIC ZOOM FOR AN IMAGING SYSTEM WITH MULTIPLE IMAGING DEVICES HAVING DIFFERENT FIXED FOV

RELATED APPLICATION

[0001] The present application claims the benefit of U.S. provisional application 61/167,226 filed on Apr. 7, 2009, the disclosure of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to an electronic zoom for imaging systems, and more particularly, the present invention relates to a continuous electronic zoom for an image acquisition system, the system including multiple imaging devices having different fixed FOV.

BACKGROUND OF THE INVENTION AND PRIOR ART

[0003] Digital zoom is a method of narrowing the apparent angle of view of a digital still or video image. Electronic zoom is accomplished by cropping an image down to a centered area of the image with the same aspect ratio as the original, and usually also interpolating the result back up to the pixel dimensions of the original. It is accomplished electronically, without any adjustment of the camera's optics, and no optical resolution is gained in the process. Typically some information is lost in the process.

[0004] In video streams (such as PAL, NTSC, SECAM, 656, etc.) the image resolution is known, and by using image sensors having substantially higher resolution, one can perform lossless electronic zoom. The ratio between the image sensor resolution and the output resolution dictates the lossless electronic zoom range. For example, having a 5 Megapixel, 2592×1944, image sensor array and an output resolution frame of 400×300 yields maximal lossless electronic zoom of 6.48:

[0005] 2592/400=6.48,

[0006] 1944/300=6.48.

[0007] Typically, a camera with a large dynamic zoom range requires heavy and expensive lenses, as well as complex design. Electronic zoom does not need moving mechanical elements, as does optical zoom.

[0008] There is a need for and it would be advantageous to have image sensors, having static, light weight electronic zoom and a large lossless zooming range.

SUMMARY OF THE INVENTION

[0009] The present invention describes a continuous electronic zoom for an image acquisition system, having multiple imaging devices each with a different fixed field of view (FOV). Using two (or more) image sensors, having different fixed FOV, facilitates a light weight electronic zoom with a large lossless zooming range. For example, a first image sensor has a 60° angle of view and a second image sensor has a 60° angle of view. Therefore, Wide_FOV=Narrow_FOV*6. Hence, switching between the image sensors provide a lossless electronic zoom of $6^2=36$. This lossless electronic zoom is also referred to herein, as the optimal zoom:

$$\text{Optimal_Zoom}=(\text{Wide_FOV}/\text{Narrow_FOV})^2.$$

[0010] It should be noted that to obtain similar zoom (×36) by optical means, for an output resolution frame of 400×300, the needed image sensor array is:

[0011] 36*400=14400,

[0012] 36*300=10800.

[0013] 14400*10800=155,520,000.

Hence, to obtain a zoom of ×36 by optical means, for an output resolution frame of 400×300, one needs a 155 Megapixel, 14400×10800, image sensor array.

[0014] According to teachings of the present invention, there is provided a method for continuous electronic zoom in a computerized image acquisition system, the system having multiple optical image acquisition devices each with a FOV. The method includes providing a first image acquisition device having a first image sensor array coupled with a first lens having a first FOV, typically a wide FOV , and a first electronic zoom. The method further includes providing a second image acquisition device having a second image sensor array coupled with a second lens having a second FOV, typically a narrow FOV, and a second electronic zoom. Typically, the angle of view of the first FOV is wider than the angle of view of the second FOV. At least a portion of the environment, viewed from within the second FOV of the second image acquisition device, overlaps the environment viewed from within the first FOV of the first image acquisition device. The method further includes computing the alignment between the first image sensor array and the second image sensor array, whereby determining an X-coordinate offset, a Y-coordinate offset and optionally, a Z-rotation offset of the correlation between the first image sensor array and the second image sensor array.

[0015] The method further includes the steps of providing a user of the image acquisition device with a zoom selecting control, thereby obtaining a requested zoom, selecting one of the image acquisition devices based on the requested zoom, acquiring an image frame with the selected image acquisition device, thereby obtaining an acquired image frame, and performing digitally zoom on the acquired image frame, thereby obtaining an acquired image frame with the requested zoom. The calibration of the alignment, between the first image sensor array and the second image sensor array, facilitates continuous electronic zoom with uninterrupted imaging, when switching back and forth between the first image sensor array and the second image sensor array. Preferably the electronic calibration is performed with sub-pixel accuracy.

[0016] Optionally, the computerized image acquisition system is configured to provide zooming functions selected from the group consisting of a bin function and a skip function. The selecting of the image acquisition device includes selecting the parameters of the bin and/or skip functions, wherein the method further includes the step of applying the selected bin/skip functions to the acquired image frame, before the performing of the digital zoom step.

[0017] In variations of the present invention, the image sensor arrays are focused to the infinite.

[0018] Optionally, the first lens is a focus adjustable lens.

[0019] Optionally, the second lens is a focus adjustable lens.

[0020] Optionally, the second lens is a zoom lens.

[0021] In image acquisition systems having more than two imaging devices, the electronic calibration step is performed on each pair of adjacently disposed image sensor arrays.

[0022] In variations of the present invention, the first image acquisition device and the second image acquisition device

are coupled with a mutual front lens and a beam splitter, wherein one portion of the light reaching the beam splitter is directed towards the first image sensor array and the remainder portion of the light reaching the beam splitter is directed towards the second image sensor array.

[0023] In embodiments of the present invention, the first image sensor array is a color sensor and the second image sensor array is a monochrome sensor, wherein a colored image frame is acquired by the first image sensor array, a monochrome image frame is acquired by the second image sensor array, wherein the colored image frame and the monochrome image frame are fused to form a high resolution colored image frame. In preferred embodiments of the present invention, the angle of view of the first FOV is wider than the angle of view of the second FOV. However, in variation of the present invention, the angle of view of the first FOV is substantially equal to the angle of view of the second FOV.

[0024] Optionally, the fusion of the colored image frame and the monochrome image frame includes the step of computing color values for the high resolution pixels of the monochrome image frame from the respective low resolution pixels of the colored image frame. Optionally, the computing of color values is performed in sub pixel accuracy.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] The present invention will become fully understood from the detailed description given herein below and the accompanying drawings, which are given by way of illustration and example only and thus not limitative of the present invention, and wherein:

[0026] FIG. **1** is a block diagram illustration of another zoom control sub-system for an image acquisition system, according to variations of the present invention;

[0027] FIG. **2** is a schematic flow diagram chart that outlines the successive steps of the continuous zoom process, according to embodiments of the present invention;

[0028] FIG. **3** is a block diagram illustration of a zoom control sub-system for an image acquisition system, according to variations of the present invention;

[0029] FIG. **4** is a schematic flow diagram chart that outlines the successive steps of the continuous zoom process, according to variations of the present invention, include using bin/skip functions;

[0030] FIGS. **5***a* and **5***b* illustrate examples of beam splitter configurations for image acquisition systems, according to embodiments of the present invention;

[0031] FIG. **6** is a block diagram illustration of a camera system, according to embodiments of the present invention, including a color image sensor having wide FOV and a color image sensor having narrow FOV; and

[0032] FIG. **7** is a block diagram illustration of another zoom control sub-system for a color image acquisition system, according to variations of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0033] Before explaining embodiments of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of the components set forth in the host description or illustrated in the drawings.

[0034] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art of the invention belongs. The methods and examples provided herein are illustrative only and not intended to be limiting.

[0035] It should be noted that in general, the present invention is described, with no limitations, in terms of an image acquisition system having two image acquisition devices. But the present invention is not limited to two image acquisition devices, and in variations of the present invention, the image acquisition system can be similarly embodied with three image acquisition devices and more.

[0036] Reference is made to FIG. **1**, which is a block diagram illustration of a zoom control sub-system **100** for an image acquisition system, according to preferred embodiments of the present invention. Zoom control sub-system **100** includes multiple image sensors, each with a fixed and preferably different FOV, configured to provide continuous electronic zoom capabilities with uninterrupted, when switching back and forth between the image sensors.

[0037] Zoom control sub-system **100** includes a tele image sensor **110** coupled with a narrow lens **120** having a predesigned FOV **140**, a wide image sensor **112** coupled with a wide lens **122** having a predesigned FOV **142**, a zoom control module **130** and an image sensor selector **150**. An object **20** is viewed from both tele image sensor **110** and wide image sensor **112**, whereas the object is magnified in tele image sensor **110** with respect to wide image sensor **112**, by a predesigned factor. In the optimal configuration, the FOV of wide image sensor **112** can be calculated by multiplying the FOV of tele image sensor **110** by the optimal zoom of image sensors **110** and **112**. Tele image sensor **110** and wide image sensor **112** are adjacently disposed, such that at least a portion of the environment viewed from within the narrow FOV of tele image acquisition device **110** overlaps the environment viewed from within the wide FOV of wide image acquisition device **112**.

[0038] Before using zoom control sub-system **100**, an electronically calibrating is performed to determine the alignment offsets between wide image sensor array **110** and tele image sensor array **112**. Typically, since the spatial offsets between wide image sensor array **110** and tele image sensor array **112** are fixed, the electronic calibration step is performed one time, after the manufacturing of the image acquisition system and before the first use. The electronic calibration yields an X-coordinate offset, a Y-coordinate offset and optionally, a Z-coordinate rotational offset of the correlation between wide image sensor array **110** and tele image sensor array **112**. Preferably, all three aforementioned offset values are computed in sub-pixel accuracy. It should be noted that for image acquisition systems with more than two image sensors, the electronic calibration step is performed on each pair of adjacently disposed image sensor arrays.

[0039] Zoom control circuit **130** receives a required zoom from an operator of the image acquisition system, and selects the relevant image sensor (**110** and **112**) by activating image sensor selector **150** position. The relevant camera zoom factor is calculated by zoom control unit **130**.

[0040] An aspect of the present invention is to provide methods facilitating continuous electronic zoom capabilities with uninterrupted imaging, performed by an image acquisition system having multiple image sensors, each with a fixed and preferably different FOV. The continuous electronic zoom with uninterrupted imaging is also maintained when switching back and forth between adjacently disposed image sensors.

[0041] Reference is also made to FIG. **2**, which is a schematic flow diagram chart that outlines the successive steps of an example continuous zoom process **200**, according to embodiments of the present invention, performed on image acquisition system, having a zoom control sub-system such as zoom control sub-system **100**. Process **200** includes the flowing steps:

Step **210**: providing a wide image acquisition device and a tele image acquisition device.

[0042] Multiple optical image acquisition devices can be used, but for description clarity, with no limitation, the method will be described in terms of two image acquisition devices: wide image acquisition device and a tele image acquisition device.

[0043] Both image acquisition devices (**110** and **112**) include an image sensor array coupled with a lens (**120** and **122**, respectively), providing a fixed FOV (tele FOV **140** and wide FOV **142**, respectively). Preferably, wide FOV **142** is substantially wider than narrow FOV **140**.

[0044] The image acquisition devices are adjacently disposed, such that at least a portion of the environment, viewed from within narrow FOV **140** of the tele image acquisition device **110**, overlaps the environment viewed from within the wide FOV **142** of wide image acquisition device **112**.

Step **220**: determining alignment offsets.

[0045] Before using zoom control sub-system **100**, an electronically calibrating is performed to determine the alignment offsets between wide image sensor array **110** and tele image sensor array **112**. Typically, since the spatial offsets between wide image sensor array **110** and tele image sensor array **112** are fixed, the electronic calibration step is performed one time, after the manufacturing of the image acquisition system and before the first use. The electronic calibration yields an X-coordinate offset and a Y-coordinate offset of the correlation between wide image sensor array **110** and tele image sensor array **112**. Preferably, the X-coordinate offset and the Y-coordinate offset are computed in sub-pixel accuracy. It should be noted that for image acquisition systems with more than two image sensors, the electronic calibration step is performed on each pair of adjacently disposed image sensor arrays.

Step **230**: zoom selection.

[0046] A user of the image acquisition selects the required zoom.

Step **240**: selecting an image acquisition device.

[0047] The zoom control **130** selects an image acquisition device with the having a zoom more proximal to the requested zoom.

Step **250**: acquiring an image frame.

[0048] An image frame is acquired by the selected image acquisition device.

Step **260**: resampling the acquired image frame to the requested zoom.

[0049] The zoom control **130** computes the zoom factor between the fixed zoom of the selected image acquisition device and the requested zoom. Based on the computed factor, zoom control **130** performs electronic zoom on the acquired image frame to meet the requested zoom.

[0050] Reference is made back to FIG. **1** and referring also to FIGS. **5***a* and **5***b*, which illustrates examples of beam splitter configurations for image acquisition systems, according to embodiments of the present invention. In variations of the present invention, wide image acquisition device **112** and tele image acquisition device **110** are coupled with a mutual front lens **570** and a beam splitter **580**, wherein one portion of the light reaching beam splitter **580** is directed towards wide image sensor array **112** and the remainder portion of the light reaching beam splitter **580** is directed towards tele image sensor array **110**. In FIG. **5***a*, the beam splitter configuration includes a wide angle lens **572**, to provide image sensor **510** a wider FOV with respect to image sensor **512**. In FIG. **5***b*, the beam splitter configuration includes wide angle lens **572**, to provide image sensor **510** a wide FOV, and a narrow angle lens **574**, to provide image sensor **512** a narrow FOV, relative to the FOV of image sensor **512**.

[0051] Reference is now made to FIG. **3**, which is a block diagram illustration of zoom control sub-system **300** for an image acquisition system, according to some embodiments of the present invention. Zoom control sub-system **300** includes an image sensor **310** having a lens module **320** with a fixed focal length lens or a zoom lens, a zoom control module **330** and a digital-zoom module **340**. An object **20** is captured by image sensor **310** through lens module **320**. Zoom control unit **330** calculates the most optimal values for image sensor **310**, binning/skip factors and continuous digital-zoom values that are provided to digital-zoom unit **340**. Setting the binning/skip factor and windowing of image sensor **310** allows to keep a suitable frame refresh rate, while digital-zoom unit **340** provides continuous zoom.

[0052] A binning function, which function is optionally provided by the sensor array provider, is a zoom out function that merges 2×2, or 4×4, or 8×8 pixels pixel array, or any other square array of pixels, into a single pixel, whereby reducing the image frame dimensions. The binning function may be refined by using algorithms such as "bi-linear" interpolation, "bi-cubic" interpolation and other commonly used digital zoom algorithms. A skip function, which function is optionally provided by the sensor array provider, is a zoom out function that allows skipping pixels while reading frame out, whereby reducing the image frame dimensions and decrease the image acquisition time.

[0053] In variations of the present invention, zoom control sub-system **100** of a image acquisition system includes the binning/skip function capabilities as in zoom control sub-system **300**.

[0054] Reference is also made to FIG. **4**, which is a schematic flow diagram chart that outlines the successive steps of an example continuous zoom process **400**, according to embodiments of the present invention, performed on image acquisition system, having a zoom control sub-system such as zoom control sub-system **100**. Process **400** includes the flowing steps:

Step **410**: providing a wide image acquisition device and a tele image acquisition device.

[0055] Multiple optical image acquisition devices can be used, but for description clarity, with no limitation, the method will be described in terms of two image acquisition devices: wide image acquisition device and a tele image acquisition device.

[0056] Both image acquisition devices (**110** and **112**) include an image sensor array coupled with a lens (**120** and **122**, respectively), providing a fixed FOV (tele FOV **140** and wide FOV **142**, respectively). Preferably, wide FOV **142** is substantially wider than narrow FOV **140**.

[0057] The image acquisition devices are adjacently disposed, such that at least a portion of the environment, viewed from within narrow FOV **140** of the tele image acquisition device **110**, overlaps the environment viewed from within the wide FOV **142** of wide image acquisition device **112**.

Step **420**: determining alignment offsets.

[0058] Before using zoom control sub-system **100**, an electronically calibrating is performed to determine the alignment offsets between wide image sensor array **110** and tele image sensor array **112**. Typically, since the spatial offsets between wide image sensor array **110** and tele image sensor array **112** are fixed, the electronic calibration step is performed one time, after the manufacturing of the image acquisition system and before the first use. The electronic calibration yields an X-coordinate offset, a Y-coordinate offset and optionally, a Z-coordinate rotational offset of the correlation between wide image sensor array **110** and tele image sensor array **112**. Preferably, all three aforementioned coordinate offset values are computed in sub-pixel accuracy. It should be noted that for image acquisition systems with more than two image sensors, the electronic calibration step is performed on each pair of adjacently disposed image sensor arrays.

Step **430**: zoom selection.

[0059] A user of the image acquisition selects the required zoom.

Step **435**: bin/skip function selection.

[0060] The zoom control **130** selects the bin/skip function, typically provided by the image sensor provider, bringing the combination of the optical zoom and the binning/skip magnification selection, to a zoom value most proximal to the requested zoom.

Step **440**: selecting an image acquisition device.

[0061] The zoom control **130** selects an image acquisition device, bringing the combination of the optical zoom and the binning/skip magnification selection, to a zoom value most proximal to the requested zoom.

Step **450**: acquiring an image frame.

[0062] An image frame is acquired by the selected image acquisition device.

Step **460**: performing electronic zoom on the acquired image frame to meet the requested zoom.

[0063] The zoom control **130** computes the zoom factor between the fixed zoom of the selected image acquisition device, combined with the selected by bin/skip factor, and the requested zoom. Based on the computed factor, zoom control **130** performs electronic zoom on the acquired image frame to meet the requested zoom.

[0064] Reference is now made to FIG. **6**, which is a block diagram illustration of a camera system **600**, according to embodiments of the present invention, including a color image sensor **612** having wide FOV **642** and a monochrome image sensor **610** having narrow FOV **640**. The angle of view of wide FOV **142** is typically wider than the angle of view of narrow FOV **140**. In some variations of the present invention, the angle of view of wide FOV **142** is substantially equal to the angle of view of narrow FOV **140**.

[0065] A principal intention of the present invention includes providing a camera system **600** and a method of use thereof, wherein the output image frame **650** has the resolution of image sensor **610**, having narrow FOV **640**, and the color of image sensor **612**, having wide FOV **642**.

[0066] Reference is now made to FIG. **7**, which is a block diagram illustration of another zoom control sub-system **700** for a color image acquisition system, according to variations of the present invention. A colored image frame **632** is acquired by wide image sensor array **612**, and a monochrome image frame **630** is acquired by narrow image sensor array **610**. When image sensor selector **750** closes contact **752**, monochrome image sensor **610** is bypassed and only color image sensor **612** having is in operation.

[0067] When image sensor selector **750** closes contact **754**, both monochrome image sensor **610** and color image sensor **612** are in operation, whereas image frames are acquired by monochrome image sensor **610** and color of image sensor **612**, synchronously. Fusion module **660** extracts the color information from color image frame **632** and fuses the extracted color information with monochrome image frame **630** to form a high resolution, colored image frame **650**. The fusion includes computing color values for the high resolution pixels of monochrome image frame **630** from the respective low resolution color image frame **632**. Preferably, the computation and alignment of the color values is performed in sub pixel accuracy.

[0068] In some variations of the present invention, the output colored image frame **650** is provided with RGB information. In other variations of the present invention, fusion module **760** transmits the Y information, obtained from monochrome image sensor **610** covered with color (Cr, Cb) information obtained from color image sensor **612**. The color information obtained from color image sensor **612** via a color space. Then, fusion module **760** merges the Y information, obtained from monochrome image sensor **610**, and the color (Cr, Cb) information. Then, color space conversion module **770** converts the image back to an RGB color space, creating colored output image frame **650**. Optionally, the (Y, Cr, Cb) image information is transmitted in separate channels to an image receiving unit, bypassing color space conversion module **770**.

[0069] The invention being thus described in terms of embodiments and examples, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the claims.

1. In a computerized image acquisition system, having multiple optical image acquisition devices each with a fixed field of view (FOV), a method for continuous electronic zoom comprising the steps of:

a) providing a first image acquisition device including:

i) a first image sensor array coupled with a first lens having a first FOV; and

ii) a first electronic zoom;

b) providing a second image acquisition device including:

i) a second image sensor array coupled with a second lens having a second FOV; and

ii) a second electronic zoom;

wherein at least a portion of the environment, viewed from within said second FOV of said second image acquisition device, overlaps the environment viewed from within said first FOV of said first image acquisition device;

c) electronically calibrating the alignment between said first image sensor array and said second image sensor array, whereby determining an X-coordinate offset and a

Y-coordinate offset of the correlation between said first image sensor array and said second image sensor array;

d) providing a user of the image acquisition device with a zoom selecting control, thereby obtaining a requested zoom;

e) selecting one of said image acquisition devices based on said requested zoom;

f) acquiring an image frame with said selected image acquisition device, thereby obtaining an acquired image frame; and

g) performing digitally zoom on said acquired image frame, thereby obtaining an acquired image frame with said requested zoom,

wherein said calibrating of said alignment between said first image sensor array and said second image sensor array, facilitates continuous electronic zoom with uninterrupted imaging, when switching back and forth between said first image sensor array and said second image sensor array.

2. The method as in claim **1**, wherein the computerized image acquisition system is configured to provide zooming functions selected from the group consisting of a bin function and a skip function; wherein said selecting of said image acquisition device includes selecting the parameters of said bin and/or skip functions; and wherein said method further includes the step of applying said selected bin/skip functions, with said selected parameters, to said acquired image frame, before said performing of said digital zoom step.

3. The method as in claim **1**, wherein said image sensor arrays are focused to the infinite.

4. The method as in claim **1**, wherein a lens, selected from the group consisting of said first lens and said second lens, is a focus adjustable lens.

5. The method as in claim **1**, wherein a lens, selected from the group consisting of said first lens and said second lens, is a focus adjustable lens.

6. The method as in claim **1** wherein said second lens is a zoom lens.

7. The method as in claim **1**, where said electronic calibration of said alignment between said first image sensor array and said second image sensor array, further determines a Z-coordinate rotational offset of the correlation between said first image sensor array and said second image sensor array.

8. The method as in claim **1**, wherein said electronic calibration is performed with sub-pixel accuracy.

9. The method as in claim **1**, wherein said electronic calibration step is performed on each pair of adjacently disposed image sensor arrays.

10. The method as in claim **1**, wherein said first image acquisition device and said second image acquisition device are coupled with a mutual front lens and a beam splitter, wherein one portion of the light reaching said beam splitter is directed towards said first image sensor array and the remainder portion of the light reaching said beam splitter is directed towards said second image sensor array.

11. The method as in claim **1**, wherein the angle of view of said first FOV is wider than the angle of view of said second FOV.

12. The method as in claim **1**, wherein said first image sensor array is a color sensor and said second image sensor array is a monochrome sensor,

wherein a colored image frame is acquired by said first image sensor array;

wherein a monochrome image frame is acquired by said second image sensor array; and

wherein said colored image frame and said monochrome image frame are fused to form a high resolution colored image frame.

13. The method as in claim **12**, wherein said fusion of said colored image frame and said monochrome image frame includes the step of computing color values for the pixels of said monochrome image frame from the respective pixels of said colored image frame.

14. The method as in claim **12**, wherein the angle of view of said first FOV is wider than the angle of view of said second FOV.

15. The method as in claim **12**, wherein the angle of view of said first FOV is substantially equal to the angle of view of said second FOV.

16. The method as in claim **13**, wherein said computing of color values is performed in sub pixel accuracy.

17. The method as in claim **2**, wherein said image sensor arrays are focused to the infinite.

18. The method as in claim **2**, wherein said second lens is a zoom lens.

19. The method as in claim **7**, wherein said electronic calibration is performed with sub-pixel accuracy.

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